High resolution UV-µ-PCD minority carrier lifetime map of PV silicon material (scan size 150 x 35 mm², 125 µm resolution)

Contamination Analysis

Characterization of electrically active contaminants

Our objectives

- Providing customized solutions for process quality monitoring
- Assisting customers in electrical failure analysis

Features

- Quality monitoring for both, mono- and polycrystalline materials
- Monitoring of process cleanliness
- Visualization of contamination source by carrier lifetime mapping
- Determination of electrically active contaminants with highest sensitivity
- In-depth analysis and identification of defects

Advantages

- Complementary characterization techniques available
- Long-term research and service experience
- Short response time

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www.iisb.fraunhofer.de/contamination-analysis
**Competences**

Minority carrier lifetime
- Microwave detected Photo Conductivity Decay (µ-PCD)
- Si, SOI, and SiC
- High resolution mapping
- Real bulk lifetime for oxidized samples by Charge-PCD

Surface photovoltage (SPV)
- Si only
- No surface passivation required
- Real bulk diffusion length for highly contaminated samples
- Enhanced reliability of results due to excitation by eight lasers
- Reliable Fe concentration determination (optical FeB dissociation)

Deep level transient spectroscopy (DLTS)
- Si and SiC
- Determination of trap concentrations and characteristics
- Depth profiling by voltage variation or sample beveling
- In-house sample preparation (Schottky contact deposition, beveling)

Complementary chemical contamination analysis
- Inductively coupled mass spectrometry (ICPMS)
- Sample preparation by vapor phase decomposition (VPD)

**Equipment**

Semilab WT-2500 platform
- Arbitrary pieces and wafers with up to 300 mm diameter
- Microwave detected photoconductivity decay (µ-PCD) for Si and SiC
- IR (905 nm) and UV (350 nm) laser excitation
- Down to 62.5 µm measurement raster
- Surface photovoltage (SPV) for Si
- Eight laser excitation (1010, 975, 950, 905, 875, 850, 780, 655 nm)
- Fe concentration mapping for p-Si (SPV or µ-PCD)
- Contactless oxide characterization (CET, $Q_{ox}$, $D_{it}$)

PhysTech Hera DLTS
- Deep level transient spectroscopy (DLTS) (appr. 20 K - 800 K)